

U.S.S.N. 10,811,657

Claim Amendments

Please amend claims 1, 9, and 17 as follows:

Please cancel claims 3, 4, 7, 8, 11, 12, 15, 16, 19, and 20 as follows:

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Listing of Claims

1. (currently amended) A method of forming an MIM capacitor to ~~prevent plasma induced damage to a capacitor dielectric, reduce~~ interaction of high-K deposition with a bottom electrode comprising:

providing a substrate;

providing a capacitor opening in said substrate;

providing [[a]] said bottom electrode comprising TiN in said capacitor opening;

thermally annealing said bottom electrode comprising exposing said bottom electrode to nitrogen gas while subjecting said bottom electrode to thermal processing;

providing a capacitor dielectric layer in said capacitor opening on said bottom electrode; and

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depositing a top electrode on said capacitor dielectric layer using a plasma-free deposition process.

2. (original) The method of claim 1 wherein said top electrode has a substantially organic-free content.

3. (canceled)

4. (canceled)

5. (original) The method of claim 1 wherein said top electrode is deposited on said dielectric layer using a deposition temperature of no greater than about 400 degrees C.

6. (original) The method of claim 5 wherein said top electrode has a substantially organic-free content.

7. (canceled)

8. (canceled)

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9. (currently amended) A method of forming an MIM capacitor to ~~prevent plasma induced damage to a capacitor dielectric, reduce interaction of high-K deposition with a bottom electrode~~ comprising:

providing a substrate;

providing a capacitor opening in said substrate;

providing ~~[[a]]~~ said bottom electrode comprising TiN in said capacitor opening;

thermally annealing said bottom electrode comprising exposing said bottom electrode to nitrogen gas while subjecting said bottom electrode to thermal processing;

providing a high-K dielectric layer in said capacitor opening on said bottom electrode; and

depositing a top electrode comprising TiN on said high-

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K dielectric layer using a plasma-free deposition.

10. (original) The method of claim 9 wherein said top electrode has a substantially organic-free content.

11. (canceled)

12. (canceled)

13. (original) The method of claim 9 wherein said plasma-free deposition process is a thermal chemical vapor deposition process or an atomic layer deposition process.

14. (original) The method of claim 13 wherein said top electrode has a substantially organic-free content.

15. (canceled)

16. (canceled)

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17. (currently amended) A method of forming an MIM capacitor to ~~prevent plasma induced damage to a capacitor dielectric, reduce interaction of high-K deposition with a bottom electrode~~ comprising:

providing a substrate;

providing a capacitor opening in said substrate;

providing [[a]] said bottom electrode comprising TiN in said capacitor opening;

subjecting said bottom electrode to chemical mechanical planarization;

thermally annealing said bottom electrode comprising exposing said bottom electrode to nitrogen gas while subjecting said bottom electrode to thermal processing;

providing a high-K dielectric layer in said capacitor opening on said bottom electrode; and

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depositing a top electrode comprising TiN on said high-K dielectric layer using a plasma-free deposition process at a deposition temperature of no greater than about 400 degrees C.

18. (original) The method of claim 17 wherein said top electrode has a substantially organic-free content.

19. (canceled)

20. (canceled)